

Missouri, Maryland, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Oregon, Ohio, Pennsylvania, South Carolina, Vermont, Virginia.

23d.—Colorado, Florida, Indian Territory, Kansas, Massachusetts, Montana, New Hampshire, New Jersey, New York, South Carolina, Texas, Utah, Virginia.

24th.—Arkansas, California, Connecticut, Colorado, Dakota, Florida, Indian Territory, Kansas, New Jersey, Nevada, Pennsylvania, South Carolina, Texas.

25th.—Arizona, Colorado, Dakota, Florida, Indian Territory, Maine, Montana, North Carolina, South Carolina, Texas.

26th.—Arizona, Arkansas, Dakota, Florida, Georgia, Indian Territory, Louisiana, Missouri, Mississippi, New Mexico, New York, Pennsylvania, Texas, Wyoming.

27th.—Arizona, Arkansas, Colorado, Dakota, Florida, Georgia, Iowa, Louisiana, Mississippi, Minnesota, Nebraska, Pennsylvania, Tennessee, Texas, Wyoming.

28th.—Arizona, Colorado, Dakota, Florida, Kansas, Louisiana, Montana, Nebraska, New Mexico, Pennsylvania, Tennessee, Texas, Utah.

29th.—Arizona, Colorado, Dakota, Florida, Kansas, Louis-

iana, Minnesota, Montana, Missouri, New Mexico, Maine, Pennsylvania, Wyoming.

30th.—Arizona, Arkansas, Alabama, Colorado, Dakota, Florida, Illinois, Iowa, Kansas, Louisiana, Minnesota, Montana, Missouri, Michigan, Massachusetts, Maine, Nebraska, Tennessee, Texas, Wisconsin, Wyoming.

ELECTRICAL PHENOMENON.

Pike's Peak, Colo.: during the prevalence of a sleet and thunder-storm on the 23d a hissing noise was heard about the iron joists around the station, and also about the anemometer. On going near the latter a strong electrical shock was felt, which caused a twitching of the muscles of the face and hands, and the hair of the head to stand on end. The cups of the anemometer seemed surrounded by an almost imperceptible cloud. By standing in any place where the building did not shelter from the wind, and by pointing a finger, would cause the same hissing sound to issue from the end of the finger and a current would be felt. The display was unaccompanied by light of any kind and could only be distinguished by the hissing noise and the sensation; it continued about fifteen minutes.

OPTICAL PHENOMENA.

HALOS.

1st-4th.—On the 1st solar and lunar halos were observed at a number of stations on the middle Atlantic coast and at scattering stations in the Gulf States, Ohio Valley, and Lake region; on the 2d lunar halos, only, were reported from the central Mississippi valley, middle, south Atlantic, and Gulf coasts, and at a few stations in the Missouri and Ohio valleys, west Gulf states, and southern plateau, while both solar and lunar halos were noted in the north Pacific coast region; on the 3d and 4th solar and lunar halos were reported from scattering stations from the Lake region southward to the Gulf coast. During this period the area of low pressure described as number ii passed from the central Ohio valley northward over the Lake region, Saint Lawrence Valley, and off the Atlantic coast, attended by cloudy and rainy weather in the districts named.

4-9th.—But a few stations reported halos during this period, and those were mostly in the districts east of the Mississippi; solar halos were, however, observed at several stations in California on the 7th.

10-11th.—On these dates halos, mostly solar, were observed in the upper lake region, upper Mississippi valley, northern plateau, and middle Pacific coast, while areas of low pressure existed in the central and northern Rocky Mountain districts, attended by cloudy or rainy weather.

12-13th.—On these dates cirrus and cirro-stratus clouds cov-

ered the Lake region and middle Atlantic states, and numerous solar halos were observed in these districts.

14-26th.—This period was comparatively free from halos; they were seldom observed, and only at scattering stations.

27-30th.—Cirrus and cirro-stratus clouds were observed from the Lake region and Ohio Valley eastward to the Atlantic coast on the 27th and 28th, and solar and lunar halos were noted at numerous stations in this region on these dates. On the 29th and 30th a few stations in the upper lake region and upper Mississippi valley reported solar and lunar halos.

The phases of the moon, Washington mean time, during June, as given in "The American Ephemeris and Nautical Almanac" for 1887, are as follows: New moon, 20th, 17 h. 44.6 m.; first quarter, May 29th, 12 h. 11.4 m.; full moon, 5th, 5 h. 29.9 m.; last quarter, 12th, 20 h. 26.6 m.; perigee, 1st, 18.2 h.; apogee, 13th, 18.9 h.

MIRAGE.

The following is from the "New York Times" of June 19th:

PALMYRA, N. Y., June 18th.—A fine mirage, the second that has appeared in two months, was seen here to day. Lake Ontario, which is sixteen miles distant, was plainly reflected on the sky; a steamer, large sailing vessels, and the waves were plainly visible.

Mirages were also reported to have been observed at the following places: Henry, Dak., 1st; Webster, Dak., 4th, 18th, 23d; Reidsville, N. C., 15th; Vineyard Haven, Mass., 19th, 25th.

MISCELLANEOUS PHENOMENA.

FOREST AND PRAIRIE FIRES.

Fort Stanton, N. Mex.: on the 1st fires were reported in the Sierra Blanco Mountains.

Grand Haven, Mich.: a forest fire broke out about one mile south of station on the 25th and spread with great rapidity over an area about two miles in length. Fences and fruit trees suffered serious damage, and several farms and orchards were threatened with destruction. Fires also occurred on the same date in the woods west-northwest of here. The fires continued on the 27th to the south and north of this place, and men were employed in digging trenches from the lake to the burning districts for the purpose of checking the progress of the flames. On the 30th the forest fires south of the station were under control.

Forest fires are also reported to have occurred as follows: Fort Apache, Ariz., 15th, and Linkville, Oregon, 27th to 30th.

INSECTS.

Wadena, Wadena Co., Minn., 3d: reports from Perham, Otter Tail Co., state that grasshoppers have made their appearance in large numbers in that vicinity and have destroyed vegetation to a great extent.

Davenport, Iowa, 3d: farmers report that the chinch bug is causing much damage to the barley fields in Scott and Clinton counties.

Raleigh, N. C., 5th: grasshoppers and flea bugs are reported as destructive to the tobacco plants in this part of the state.

Owatonna, Steele Co., Minn., 7th: the chinch bug has injured the crops in this county.

Dover, Del., 8th: the rose bug is causing much injury to fruit and grain in this vicinity. Vineyards and orchards are covered with myriads of these bugs, and they have also in-

vaded dwellings. The potato bug has also damaged to a considerable extent the tomato fields in the vicinity.

The following is from "The Daily (Chattanooga, Tenn.) Times" of June 20th:

HARRISBURG, Pa., June 19th.—The entire lower portion of Centre county, Pa., is at present plagued by a most extraordinary visitation of snails or garden slugs. They come from the hiding places in crevices, under board walks, stones, etc., only at night, and they cover the roads and walks by the million. In Penn's Valley and Broomfield and the surrounding country they have eaten every growing thing in their path. Some gardens have been entirely destroyed. A letter from Penn's Valley says that on mornings after warm nights walks and roads are literally covered with the slum these insects leave in their trails and by bushels of dead snails that have been crushed by pedestrians and wagons. Lime, Paris green, salt, and other insect destroyers have been scattered liberally where the snails travel and feed, but they have no effect on them. The singular part of this plague is that no insects of the kind were ever known to be in the county before. Where they came from or what influences have brought them there so suddenly and in such immense numbers is a mystery no one has been able to solve.

Charleston, Coles Co., Ill., 26th: chinch bugs are destroying Indian corn in some places. During the earlier part of the month the potato crop was injured by potato bugs.

East Portland, Multnomah, Co., Oregon, 30th: caterpillars are destroying the foliage of apple trees; some orchards have been almost ruined.

Spartanburg, Spartanburg Co., S. C., 30th: grasshoppers are reported to be very numerous.

Swartz Creek, Genesee Co., Mich., 30th: insects have done serious injury to the wheat crop in this county.

La Crosse, Wis., 30th: chinch bugs have caused great damage in this section; the corn crop has escaped serious injury.

METEORS.

Nashua, Hillsborough Co., N. H.: at 8.42 p. m. on the 15th a meteor was observed in the western sky, just above Jupiter; it shot downward towards the south or southeast and exploded when at an altitude of 15°, showing red, white, and green colors.

Des Moines, Iowa, 16th: a large meteor fell last night upon the farm of Ollie Botelson, who lives not far from what is known as Pilot Mound. So rapid was its descent that the roar was almost deafening. A beautiful trail of light was seen in its wake, which illuminated the earth for many miles and lighted up the scene as would a bright moonlight.

Keeler, Inyo Co., Cal.: a brilliant meteor of dark bluish tint was observed at 12.35 a. m. on the 17th; it was first seen at an altitude of 40°, azimuth 45°, and passed in a parallel line to azimuth 88°, being visible about seven seconds. Several meteors of minor brightness were observed in the southwestern sky between midnight and 1 a. m.

Fort Maginnis, Mont.: a very large meteor was observed at this station at 11 p. m. of the 18th; it passed almost entirely across the sky from southeast to southwest.

Corpus Christi, Tex., 21st: a large meteor was observed at 9.45 a. m. in altitude 50° and azimuth 20°; it disappeared beyond the horizon in azimuth 10°. The color of the meteor was whitish-green, and it appeared about four times as bright as the planet Venus.

Meteors were also observed during the month on the following dates:

- 1st.—Charleston, Ill.; Fort Bidwell, Cal.
- 5th and 9th.—Fort Grant, Ariz.
- 12th.—Windsor, Ill.; Kalamazoo, Mich.; Elkin, Ky.; Evansville, Ind.
- 13th.—Riverside, Cal.; Springfield, Ill.

15th.—North Colebrook, Conn.; Cambridge and Dudley, Mass.; Nashua, N. H.

16th.—Windsor, Ill.; Dover and Egg Harbor City, N. J.

17th.—Tecumseh, Nebr.; Davenport, Iowa.

18th.—Butler, Ind.; Charlotte, N. C.; Cleburne, Tex.; Middlebrook, W. Va.; Bishopville and Stateburg, S. C.

19th.—Cleveland and Jacksonborough, Ohio; Cleburne, Tex.

20th and 22d.—Cleburne, Tex.

23d.—Stateburg, S. C.

25th.—Concord and Nashua, N. H.

26th.—Yuma, Ariz.

27th.—Gardiner, Me.

28th and 29th.—Kalamazoo, Mich.

30th.—Pekin, Ill.

MIGRATION OF BIRDS.

Ducks flying northward.—Tatoosh Island, Wash., 5th.

Ducks flying eastward.—Fort Custer, Mont., 4th.

POLAR BANDS.

Polar bands were reported from the following stations:

Lead Hill, Ark., 1st, 15th; Archer, Fla., 1st, 4th, 5th, 7th, 9th, 11th, 21st, 24th; Stateburg, S. C., 3d; Prairie du Chien, Wis., 3d, 14th to 16th; Napoleon, Ohio, 4th, 11th to 15th, 19th, 20th, 22d, 24th, 25th, 27th, 28th, 30th; Sitka, Alaska, 5th; Gardiner, Me., 5th, 15th, 17th; Oakland, Cal., 10th; Wauseon, Ohio, 10th, 12th, 13th, 20th, 22d, 24th, 25th, 27th; Montrose, Colo., 12th; Riley, Ill., 14th, 27th, 29th; Wytheville, Va., 15th; Ninnescah, Kans., 17th, 21st; Nashville, Tenn., 24th; Beverly, N. J., 25th; Bowling Green, Ky., 27th; North Colebrook, Conn., 29th.

SAND STORMS.

Abilene, Tex., 5th: a sand storm, during which the wind attained a velocity of fifty-two miles an hour, began at this place at 6.40 p. m.; for three-quarters of an hour the air was filled with dust to such an extent that buildings only fifty feet away could not be seen. The dust extended to an elevation of about two hundred feet.

Atlantic City, N. J.: a heavy gale prevailed during the 14th; the weather was so dry that the wind caused the sand to form deep drifts, resembling snow drifts; at some street corners the sand accumulated to such a depth as to impede travel.

San Carlos, Ariz., 26th: a violent sand and dust storm set in from the south at about 2.30 p. m. and continued for about one hour, the wind blowing at the rate of thirty-five miles per hour; a dense cloud of sand and dust enveloped everything.

Sand storms also occurred at the following places:

Rio Grande City, Tex., 2d: Fort McDowell, Ariz., 2d, 3d, 5th, 23d, 29th, 30th; Yuma, Ariz., 2d, 12th, 13th; Keeler, Cal., 5th, 13th, 18th; Fort Thomas, Ariz., 8th, 14th; Maricopa, Ariz., 22d; Fort Maginnis, Mont., 25th; San Carlos, Ariz., 25th, 29th, 30th.

SUN SPOTS.

Mr. H. D. Govey, of North Lewisburg, Champaign Co., Ohio, reports having observed sun spots on the following dates: 1st, 3d, 4th, 7th, 10th to 19th, 21st, 22d, 23d, 26th to 30th, or sun spots were observed on every clear day during the month.

The following report on sun spots is taken from the report of the "Illinois Weather Service":

Mr. John W. James, observer at Riley, McHenry county, reports, as follows: "A very large spot came in sight on east limb of sun on the 5th, was on sun's meridian 11th, and disappeared, by the solar rotation, 17th; estimated diameter, 37,700 miles. A smaller spot appeared on east limb, morning of 26th."

VERIFICATIONS.

INDICATIONS.

The predictions for all districts east of the Rocky Mountains for June, 1887, were made by 2d Lieutenant F. M. M. Beall, Signal Corps, Assistant; those for the Pacific coast districts were made by 2d Lieutenant J. E. Maxfield, Signal Corps,

Assistant; the verifications were determined by 1st Lieutenant Robert Craig, 4th Artillery, U. S. Army, Acting Signal Officer and Assistant.

The detailed comparison of the tri-daily indications for June, 1887, with the telegraphic reports for the succeeding